

Gary Chilson, Editor

*Social Sciences, Humanities & English Division  
Paul Smith's College  
Paul Smiths, New York 12970*

Covering the broad range of issues that concern the Adirondack-Champlain Biosphere Reserve, AJES exists to foster a dialogue about this area loved by so many. The journal purposely avoids serving as the vehicle for any single or special point of view. To the contrary, in searching for common ground AJES welcomes variety and a broad spectrum of opinion from its contributors.

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# Prerogative

"Editorially Speaking"

Gary Chilson

*Paul Smith's College*

I was struck recently by a political cartoon published in the Adirondack Daily Enterprise. It was following the bombing in Saudi Arabia and it showed a surprised-looking man pumping gas. The price on the pump was "19 Dead," and the caption read, "Wow! Oil's really getting expensive!" I suddenly realized the price shown was only one particular day's most obvious payment. We must remember all the previous and continuing payments we make for maintaining our sources of energy. We should also consider the costs we incur after we actually use the stored solar energy resources we wrest from the rest of the world. Then I thought, how long can we really afford a petroleum economy and what happens to the Adirondacks when we can't? The world isn't full of oil and we certainly can't afford the environmental costs of a full scale shift to a global coal economy. We clearly need to understand the central role of energy as the master resource in the process of sustainable development.

While most of the cost of wars and stationing our legionnaires overseas is borne by those of us actually alive at the time, the remaining costs and almost all of the costs of actually using the fossilized solar energy is paid on credit. The debt we incur from using fossil fuels — acid rain, global warming, poisoned soil and water, species ex-

tingtion, aesthetic degradation, etc. — certainly isn't going to magically disappear and seems much too large and difficult for our children to forgive. Eventually, too, we will realize that a society dependent on burning fossil energy can't be sustained. Then the important question becomes: how will our industrial society, so dependent on the consumption of fossil energy for its survival, manage the transition to perpetual and renewable energy sources?

One useful way of envisioning a transition to a sustainable society might be seen in the local process of sustainable development. After all, reducing local energy liabilities by achieving greater energy efficiency and independence from distant sources requires a process of community development which binds together the four component *e's* of sustainable development: *economic development* through local *empowerment* to achieve *equity* among humans within the *ecological integrity* constraints of their bioregion (equity for nature).

Energy flows first through the natural ecosystem, then through the human economic system and some of it becomes embodied, briefly, within the cycles of matter of both systems. Ecologists measure and examine the energy flows and embodiments that connect producer plants with the various trophic levels of consumer animals. Economists do essentially the same



but call the flow of energy and embodied matter through the economic system “factors of production” or “goods and services” and they use a subjective measure of exchange value rather than an objective thermodynamic measure of value.

By recognizing energy as the common denominator we can begin to see that the sustainable development components of a region’s ecological integrity and economic development are linked. Of

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course, measuring the exchange value of economic production and consumption in terms of energy or the magnitude of energy flows through ecosystems in terms of dollars makes no sense but using a common denominator allows apples and oranges to be measured together. Our physical impact on the environment, an inescapable result of economic activity, can be estimated using energy units of value. The physical laws of thermodynamics govern economics and commits us to increased entropy and thus environmental and resource degradation. Simply put, the more energy consumed, the

more entropy or disorder is increased.

Through the lens of thermodynamics we can begin to appreciate the full dollar cost of using different types of energy. Using this perspective, a widely-used introductory college textbook in environmental studies (G. Tyler Miller’s *Living in the Environment*) suggests that oil’s actual price is close to \$500 per barrel — if you include all the hidden social and environmental costs. The nominal price we pay on the world market is only about \$15 a barrel. The difference comes out of our taxes to support the military but mostly from the debt we impose on our children.

Achieving equity, our idea of who should get access to how much of the flows of goods and services (the flow of embodied energy), is approached through the political process of empowerment rather than nature’s less humane “red in tooth and claw” method. We try to implement our vision of an equitable distribution of both costs and benefits through institutional mechanisms such as property rights and local political decisions. Every physical structure or property object that exists in our communities, such as a first or second home, a business, public utility systems and roads, or even another beaver lodge or maple tree, organizes and channels embodied energy flows. While beavers ignore most local land-use control methods humans use, our local political institutions nevertheless control the vast majority of energy flows and, thus, the distribution of embodied energy (dollar-valued consumer goods and services) through our communities.

Consider, for a moment, the eco-economic perspective of the

sun-drenched Middle East: they will eventually reap the consequences of their control over the limited supply of fossilized solar energy beneath their deserts. Petroleum faces an exponential growth in demand as industrialism expands and the world’s population doubles. Now imagine the Adirondacks when our children and grandchildren are paying off our ecological debts and “cheap” fossil fuels are remembered as part of “the Good Old Days.” Can the Adirondacks’ eco-economic community be sustained without large inputs of fossil fuels? Will tourism, one of the region’s most important current methods of capturing and channeling embodied energy flows, continue to sustain us when transportation and winter heating costs increase significantly? Will the pulp and paper industry be an important source of embodied energy “income” if less energy-intensive, therefore less expensive, recycling technologies are developed elsewhere, closer to urban trash centers?

The explicit recognition of energy’s role in sustainable development should help us realize the importance of the local community’s control over their energy flows and embodied energy channels; their use of solar income and/or fossilized savings and the embodied energy infrastructure or distribution channels. Reducing our dependence upon imported fossil fuels by developing our local sources of energy — solar, wind, biomass, and hydro — and by increasing our energy use efficiency through private and public infrastructure improvements provide us with a number of sustainable economic development and employ-





ment possibilities. The proposed wood-fired cogeneration power plant project at Tupper Lake may be an important and useful example.

Even as we must promote energy efficiency and a reliance on solar technologies, Dale French questions the actual benefits of environmental command and control legislation in this issue of AJES and reminds us of their very real costs using the scientific uncertainty surrounding the acid rain controversy here in the Adirondacks as an example. Rod Johnson reports what he and some of our children in the Glens Falls area are doing to help reduce acid rain by purchasing and retiring some of the tradable SO<sub>2</sub>

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emission allowances using the new economic incentives approach, rather than police power. Stuart Widmann and Dave A. Drake's analysis of Adirondack timber resources points out the changes in the region's autotrophic sources of solar power that have already occurred and establishes a foundation on which to consider some impli-

cations for the region's forest products industry's future. Dave Gibson's historical review of Adirondack rivers and hydropower issues reminds us of the lengthy struggles involved in establishing appropriate institutional controls. And Chad Dawson completes this issue of AJES with a proposal for a broadly perceived Adirondack wilderness planning strategy based on an appreciation of the ecosystem's carrying capacity (perhaps visualized now as the ecosystem's embodied energy flow constraints) to help us focus on the interrelationships between recreation policy and all the Wilderness and Wild Forest Areas of the Adirondacks. □